Appendix C

Definitions

Accuracy - The degree of conformance between the estimated or measured position and/or velocity of a platform at a given time and its true position or velocity. Radionavigation system accuracy is usually presented as a statistical measure of system error and is specified as:

- Predictable - The accuracy of a radionavigation system's position solution with respect to the charted solution. Both the position solution and the chart must be based upon the same geodetic datum. (Note: Appendix B discusses chart reference systems and the risks inherent in using charts in conjunction with radionavigation systems.)
- Repeatable - The accuracy with which a user can return to a position whose coordinates have been measured at a previous time with the same navigation system.
- Relative - The accuracy with which a user can measure position relative to that of another user of the same navigation system at the same time.

Air Traffic Control (ATC) - A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic.

Approach Reference Datum - A point at a specified height above the runway centerline and the threshold. The height of the MLS approach reference datum is 15 meters (50 ft). A tolerance of plus 3 meters (10 ft) is permitted.

Area Navigation (RNAV) - Application of the navigation process providing the capability to establish and maintain a flight path on any arbitrarily chosen course that remains within the coverage area of navigation sources being used.

ARISTOTELES - European/U.S. gravity mission planned for 1996.

Automatic Dependent Surveillance - A function in which aircraft automatically transmit navigation data derived from onboard navigation systems via a datalink for use by air traffic control.

Availability - The availability of a navigation system is the percentage of time that the services of the system are usable. Availability is an indication of the ability of the system to provide usable service within the specified coverage area. Signal availability is the percentage of time that navigational signals transmitted from external sources are available for use. Availability is a function of both the physical characteristics of the environment and the technical capabilities of the transmitter facilities.

Block II/IIA - The satellites that will form the initial GPS constellation at FOC.

Cellular Triangulation - A method of location determination using the cellular phone system where the control channel signals from a mobile phone are captured by two or more fixed base stations and processed according to an algorithm to determine the location of the mobile receiver.

Circular Error Probable (CEP) - In a circular normal distribution (the magnitudes of the two one-dimensional input errors are equal and the angle of cut is 90^{o}), circular error probable is the radius of the circle containing 50 percent of the individual measurements being made, or the radius of the circle inside of which there is a 50 percent probability of being located.

Coastal Confluence Zone (CCZ) - Harbor entrance to 50 nautical miles offshore or the edge of the continental shelf (100 fathom curve), whichever is greater.

Common-use Systems - Systems used by both civil and military sectors.

Conterminous U.S. - Forty-eight adjoining states and the District of Columbia.

Coordinate Conversion - The act of changing the coordinate values from one system to another; e.g., from geodetic coordinates (latitude and longitude) to Universal Transverse Mercator grid coordinates.

Coordinated Universal Time (UTC) - UTC, an atomic time scale, is the basis for civil time. It is occasionally adjusted by one-second increments to ensure that the difference between the uniform time scale, defined by atomic clocks, does not differ from the earth's rotation by more than 0.9 seconds.

Coverage - The coverage provided by a radionavigation system is that surface area or space volume in which the signals are adequate to permit the user to determine position to a specified level of accuracy. Coverage is influenced by system geometry, signal power levels, receiver sensitivity, atmospheric noise conditions, and other factors which affect signal availability.

Differential - A technique used to improve radionavigation system accuracy by determining positioning error at a known location and subsequently transmitting the determined error, or corrective factors, to users of the same radionavigation system, operating in the same area.

Distance Root Mean Square (drms) - The root-mean-square value of the distances from the true location point of the position fixes in a collection of measurements. As used in this document, 2 drms is the radius of a circle that contains at least 95 percent of all possible fixes that can be obtained with a system at any one place. Actually, the percentage of fixes contained within 2 drms varies between approximately 95.5 percent and 98.2 percent, depending on the degree of ellipticity of the error distribution.

En Route - A phase of navigation covering operations between a point of departure and termination of a mission. For airborne missions the en route phase of navigation has two subcategories, en route domestic and en route oceanic.

En Route Domestic - The phase of flight between departure and arrival terminal phases, with departure and arrival points within the conterminous United States.

En Route Oceanic - The phase of flight between the departure and arrival terminal phases, with an extended flight path over an ocean.

Flight Technical Error (FTE) - The contribution of the pilot in using the presented information to control aircraft position.

Full Operational Capability (FOC) - For GPS, this is defined as the capability that will occur when 24 operational (Block II/IIA) satellites are operating in their assigned orbits and have been tested for military functionality and meet military requirements.

Geocentric - Relative to the Earth as a center, measured from the center of mass of the Earth.

Geodesy - The science related to the determination of the size and shape of the Earth (geoid) by such direct measurements as triangulation, leveling, and gravimetric observations; which determines the external gravitational field of the Earth and, to a limited degree, the internal structure.

Geometric Dilution Of Precision (GDOP) - All geometric factors that degrade the accuracy of position fixes derived from externally-referenced navigation systems.

Inclination - One of the orbital elements (parameters) that specifies the orientation of an orbit. Inclination is the angle between the orbital plane and a reference plane, the plane of the celestial equator for geocentric orbits and the ecliptic for heliocentric orbits.

Initial Operational Capability (IOC) - For GPS, this is defined as the capability that will occur when 24 GPS satellites (Block I/II/IIA) are operating in their assigned orbits and are available for navigation use.

Integrity - Integrity is the ability of a system to provide timely warnings to users when the system should not be used for navigation.

Multipath Transmission - The propagation phenomenon that results in signals reaching the receiving antenna by two or more paths. When two or more signals arrive simultaneously, wave interference results. The received signal fades if the wave interference is time varying or if one of the terminals is in motion.

Meaconing - A technique of manipulating radio frequency signals to provide false navigation information.

Nanosecond (ns) - One billionth of a second.

National Airspace System (NAS) - The NAS includes U.S. airspace; air navigation facilities, equipment and services; airports or landing areas; aeronautical charts, information and service; rules, regulations and procedures; technical information; and labor and material used to control and/or manage flight activities in airspace under the jurisdiction of the U.S. System components shared jointly with the military are included.

National Command Authority (NCA) - The NCA is the President or the Secretary of Defense, with the approval of the President. The term NCA is used to signify constitutional authority to direct the Armed Forces in their execution of military action. Both movement of troops and execution of military action must be directed by the NCA; by law, no one else in the chain of command has the authority to take such action.

Nautical Mile (nm) - A unit of distance used principally in navigation. The International Nautical Mile is 1,852 meters long.

Navigation - The process of planning, recording, and controlling the movement of a craft or vehicle from one place to another.

Nonprecision Approach - A standard instrument approach procedure in which no electronic glide slope is provided (e.g., VOR, TACAN, Loran-C, or NDB).

Primary Means of Navigation - Identifies navigation equipment which provides the only required means on an aircraft of satisfying the necessary level of accuracy, integrity, and availability for a particular area, route, procedure, or operation. The failure of a primary means of navigation requires reversion to a non-normal means of navigation (e.g., dead reckoning).

Precise Time - A time requirement accurate to within 10 milliseconds.

Precision Approach - A standard instrument approach procedure using a ground-based system in which an electronic glide slope is provided (e.g., ILS).

Radiodetermination - The determination of position, or the obtaining of information relating to positions, by means of the propagation properties of radio waves.

Radiolocation - Radiodetermination used for purposes other than those of radionavigation.

Radionavigation - The determination of position, or the obtaining of information relating to position, for the purposes of navigation by means of the propagation properties of radio waves.

Receiver Autonomous Integrity Monitoring (RAIM) - A technique whereby a civil GPS receiver/processor determines the integrity of the GPS navigation signals without reference to sensors or non-DOD integrity systems other than the receiver itself. This determination is achieved by a consistency check among redundant pseudorange measurements.

Reliability - The probability of performing a specified function without failure under given conditions for a specified period of time.

Required Navigation Performance - A statement of the navigation performance accuracy necessary for operation within a defined airspace, including the operating parameters of the navigation systems used within that airspace.

RHO (Ranging Mode) - A mode of operation of a radionavigation system in which the times for the radio signals to travel from each transmitting station to the receiver are measured rather than their differences (as in the hyperbolic mode).

Roadside Beacons - A system using infrared or radio waves to communicate between transceivers placed at roadsides and the in-vehicle transceivers for navigation and route guidance functions.

Sigma - See Standard Deviation.

Spherical Error Probable (SEP) - The radius of a sphere within which there is a 50 percent probability of locating a point or being located. SEP is the three-dimensional analogue of CEP.

Standard Deviation (sigma) - A measure of the dispersion of random errors about the mean value. If a large number of measurements or observations of the same quantity are made, the standard deviation is the square root of the sum of the squares of deviations from the mean value divided by the number of observations less one.

Supplemental Air Navigation System - An approved navigation system that can be used in controlled airspace of the National Airspace System in conjunction with a primary means of navigation.

Surveillance - The observation of an area or space for the purpose of determining the position and movements of craft or vehicles in that area or space.

Survey - The act of making measurements to determine the relative position of points on, above, or beneath the Earth's surface.

Surveying - That branch of applied mathematics which teaches the art of determining accurately the area of any part of the Earth's surface, the lengths and directions of the bounding lines, the contour of the surface, etc., and accurately delineating the whole on a map or chart for a specified datum.

Terminal - A phase of navigation covering operations required to initiate or terminate a planned mission or function at appropriate facilities. For airborne missions, the terminal phase is used to describe airspace in which approach control service or airport traffic control service is provided.

Terminal Area - A general term used to describe airspace in which approach control service or airport traffic control service is provided.

Theta - Bearing or direction to a fixed point to define a line of position.

Time Interval - The duration of a segment of time without reference to where the time interval begins or ends.

TOPEX/POSEIDON - TOPographic EXperiment/POSEIDON mission, a joint U.S./French oceanic mapping mission launched in August 1992.

Universal Transverse Mercator (UTM) Grid - A military grid system based on the Transverse Mercator projection applied to maps of the Earth's surface extending to 84^{o}N and 80^{o}S latitudes.

Vehicle Location Monitoring - A service provided to maintain the orderly and safe movement of platforms or vehicles. It encompasses the systematic observation of airspace, surface and subsurface areas by electronic, visual or other means to locate, identify, and control the movement of platforms or vehicles.

World Geodetic System (WGS) - A consistent set of parameters describing the size and shape of the Earth, the positions of a network of points with respect to the center of mass of the Earth, transformations from major geodetic datums, and the potential of the Earth (usually in terms of harmonic coefficients).